ЕКОНОМИКА
ISSN 0350-137X, EISSN 2334-9190, UDK 338 (497,1)
Vol. 60, october-december 2014, № 4
Стр. 77-91

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SCIENTIFIC REVIEW ARTICLE
Received: November 05, 2014
Accepted: December 01, 2014

ANALYSIS OF SUSTAINABLE COMPETITIVENESS OF EUROPEAN COUNTRIES IN 2013

Abstract

The concept of sustainable competitiveness of a country is a newly created category by the World Economic Forum 2011. In the paper, an empirical analysis of sustainable competitiveness of European countries has been carried out, according to the World Economic Forum data for the year 2012-2013. The key research question regarding the trade-off between the Global Competitiveness Index (GCI) and the Sustainability-Adjusted Global Competitiveness Index (SCI) of European countries in 2013, has led to a negative answer, i.e., the empirical analysis did not confirm the negative relationship between these two phenomena.

Key words: *sustainable development, components of sustainable development, environment, competitiveness, sustainable competitiveness.*

JEL Classification: O440

АНАЛИЗА ОДРЖИВЕ КОНКУРЕНТНСТИ ЗЕМАЉА ЕВРОПЕ У 2013. ГОДИНИ

Апстракт

Концепт одрживе конкурентности земље представља новокреирану категорију од стране Светског економског форума 2011. године. У раду је реализована емпиријска анализа одрживе конкурентности земаља Европе према подацима Светског економског форума за 2012-2013. години. На кључно истраживачко питање у вези постојања својеврсне погодбе (trade-off) између Глобалног индекса конкурентности (Global Competitiveness Index -GCI) и Глобалног индекса одрживе конкурентности (Sustainability-Adjusted Global Competitiveness Index -SCI) земаља Европе у 2013. години дошло се до негативног одговора, односно емпиријском анализом није потврђена негативна веза између ова два феномена.

Кључне речи: *одрживи развој, компоненте одрживог развоја, животна средина, конкурентност, одржива конкурентност.*

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Introduction

There is a great deal of concerns in studying of the country competitiveness phenomenon, starting with its conceptual determination. Somehow this is understandable, bearing in mind that we are dealing with the category which includes numerous economic characteristics subject to extremely dynamic and hardly predictable changes. Essentially, it is a multidimensional and relative concept (Spence & Hazard, 1998). This is simply because the key features of the phenomenon of competitiveness are changing at different times and circumstances. Thus, the phenomenon of competitiveness can be seen both in terms of time and of space i.e., countries or regions. In short, it is a dynamic concept, which forces economic actors to continuously think not only about their own roles, strengths and weaknesses and responsibilities, but also the strengths and weaknesses of other actors (Sirkin, Hamerling & Bgatacharya, 2008).

OECD defines competitiveness as the country's ability to produce goods and services that may be of exchange in global market, under free and fair market conditions, while simultaneously maintaining and expanding the real incomes of its people (OECD, 1996, p. 24). Some authors note that the country's competitiveness is its ability to generate economic growth and employment, with the manifestation of balance of payments imbalances (Fagerberg, 1998).

Over the past fifteen years notional determination of the complex of a country's competitiveness, has been complemented by various requirements of the paradigm of sustainable development. For example, the Union of Industrial and Employers Confederations of Europe notes that high standard of living, with a sustainable balance of payments reflects the country's competitiveness. The European Commission defines competitiveness as a sustainable growth in living standards of the country or group of countries, with the lowest possible level of involuntary unemployment (European Competitiveness Report, 2011; Rosamond, 2002).

The essential idea of the concept of sustainable competitiveness is the inclusion of social and environmental dimensions (Cvetanovic, et al. 2014) into the economic concept of competitiveness, which were not included in conventional considerations of the content of this category. In a word, the concept of sustainable competitiveness is trying to assess whether a country has the potential to be successful and to grow in the medium and long term (Balkyte & Tvaronavičiene, 2010), as well as to determine whether the process of developing its economy contributes to creating a model of society that is desirable in the long run. As a reminder, at the beginning of the previous century well-known German sociologist Max Weber lucidly remarked that the countries did not compete only in terms of products and services but also in terms of the education system and wide dominant value system (Weber, 1989).

The International Institute for Management Development has compiled a list of over 300 factors of competitiveness, and the country's position in terms of international competitiveness is determined by aggregating these factors. (IMD; 2005). Many of these factors are related to health, education, condition of the natural environment.

Since 2005, the World Economic Forum has based the analysis of competitiveness on the Global Competitiveness Index – GCI, which includes micro and macroeconomic foundations of the country's competitiveness. Competitiveness is defined as the set of institutions, policies and factors that determine the level of productivity of a country.

Beginning in 2011, parallel to data on global competitiveness this institution started to publish data – Sustainability-Adjusted Global Competitiveness Index – SCI. It should be noted that the GCI is predominately based on economic indicators and it is mostly about the competitiveness of countries seen through the prism of short and to some extent medium

term. Conversely, SCI represents a long-term view of the country's competitiveness. Sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations (World Commission on Environment and Development, 1987). The paradigm of sustainable development brings a man into its focus as well as meeting his current and future needs (Gladwin, et al., 1995).. During the last three decades, the concept of sustainability has been qualitatively significantly expanded. The paradigm of sustainability as a new philosophy of development in addition to economic and environmental requirements, takes into account the growing social demands (Messner, 1997). In this regard, an important question arises whether the requirements for an increase in the short term GCI are compatible with the requirement for continuous improvement of SCI? In other words, whether the promotion of sustainable competitiveness of European countries involves reducing the competitiveness understood exclusively as the economic context? The obtaining a competent answer to the question of how sustainability affects the competitiveness and economic activities, is in a function of recognizing tools for identifying strengths within which countries can increase sustainable competitiveness (Kotabe & Murray, 2004). More complete integration of the concept of sustainability is a target that the World Economic Forum aims at. This is because the concept of sustainability is in a center of the attention of policy makers, business leaders and the public in general.

The paper analyzed data for 34 European countries on competitiveness (GCI) and Sustainability-Adjusted Global Competitiveness Index (SCI) by the World Economic Forum, presented in the Global Competitiveness Index Report 2012-2013. The first part of the paper presents a short theoretical overview of concept and metrics of sustainable competitiveness of countries, the category newly created by the World Economic Forum. Empirical analysis of sustainable competitiveness of European countries in 2013 has been conducted in the second part of the paper. First, simple regression analysis examined the type and form of functional dependency between social and environmental pillars for all 79 countries covered by the Report. Correlation matrix was designed according to all available values of the indicators that made up the two aforementioned pillars of sustainability within the GCI framework in 2012-2013. They, the data for the European economies in a broader sense (the European economies in the first step included Russia and Turkey) were analyzed. Categorization of European economies is given at five potential groups:

- countries that have 15% or more higher rankings in terms of SCI than in terms of GCI,
- countries that have 5% to 15% higher rankings in terms of SCI than in terms of GCI,
- stabile countries with insignificant difference between SCI and GCI (±5%),
- countries that have 5% to 15% lower rankings in terms of SCI than in terms of GCI,
- countries that have over 15% lower rankings in terms of SCI than in terms of GCI,

By using a cluster analysis and bottom-up principle a grouping of 34 countries in Europe was made, according to the observed competitiveness variables. Then by using graphical analysis, the position and value of the sustainability pillars and key indicators of sustainable competitiveness of European countries divided into two groups were perceived. The first group includes countries that occupy leading positions based on the criterion of sustainable competitiveness (Austria, Denmark, Finland, Germany, the Netherlands, Norway, Sweden and Switzerland) and the second group includes countries that have recorded the lowest values of SCI in Europe in 2013 (Bulgaria, Croatia, Greece, Macedonia, Romania and Serbia).

1. Analytical framework for GCI and SCI

An attempt made by the World Economic Forum in order to adjust the indices of competitiveness of countries for 2011 and 2012 to the requirements of environmental and social sustainability, represents a significant contribution to the operationalization of the sustainable competitiveness concept. Sustainable competitiveness of countries is a new area of research, and it is quite certain that a good portion of the data relevant to the measurement of key categories is missing.

Figure 1: The SCI structure

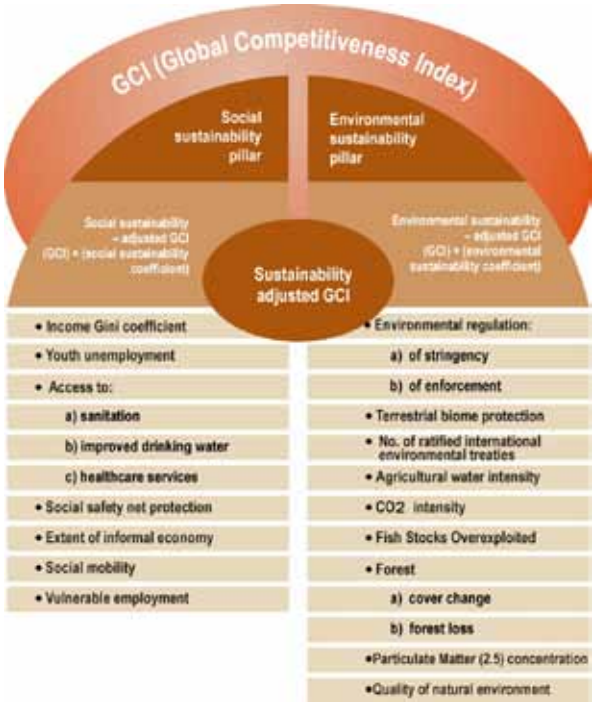
Modified according to: Global Competitiveness Report 2012-2013, World Economic Forum, p.8& p.52.

As it can be seen from Figure 1, the quantification of SCI starts from GCI, adjusted for factors that include social and environmental sustainability. The graph highlights the central position of competitiveness as a premise of economic prosperity of the country.

Achieving a certain level of economic prosperity is the essential material assumption of improving the living standards of the population in any country. In this procedure however, the ability of countries to generate prosperity for its citizens in a sustainable manner is assessed. In other words, competitiveness is a necessary, but is not a sufficient condition for prosperity of individual countries. Hence the need for an appropriate measure of competitiveness that is harmonized with social and environmental dimension of sustainability is more than obvious.

The methodology of measuring the Sustainability-Adjusted Global Competitiveness Index is based on the premise of linear interdependence between the index of competitiveness, environmental sustainability and social sustainability as dimensions of competitiveness. As a result, SCI is calculated as the average of the two indices adjusted for sustainability: social sustainability-adjusted GCI and environmental sustainability-adjusted GCI (Figure 2).

Figure 2: The SCI structures



Modified according to: Global Competitiveness Report 2012-2013 (2012, p.52) and Crotti, (2012, August 27)

Figure 2 shows that the social and environmental dimensions of sustainable competitiveness are treated as independent adjustments for any country's performance in terms of the GCI. Aggregation leads to three possible outcomes: Environmental sustainability-adjusted GCI, Social sustainability-adjusted GCI and Sustainability-adjusted GCI which combines the dimensions of environmental and social sustainability.

Since there are no clear theoretical guidelines for assigning weights to individual elements, an equal weight is given to indicators within each pillar. Each pillar has been turned into an 'adjustment coefficient' with a range of 0.8 to 1.2, which is then used for adjusting GCI results up or down within this range. This results in the adjusted result which is at maximum 20% lower or 20% higher than the basic GCI score.

Due to the fact that some of the aspects of sustainability are estimated in the pillars of social and environmental sustainability, the results reflect the overall performance of all aspects instead of a particular element. In a sense, this means that poor performance in some aspects can be compensated with good results in some other areas. This can lead to counterintuitive results.

Instead of the 144 economies covered by the GCI, in analysis of the sustainable competitiveness by the World Economic Forum for 2013, there is a subsample of 79 countries. This is a first attempt to present the scope of sustainable competitiveness of countries that are preparing themselves for the future competitiveness in the long term.

Fairly speaking, there are many areas that are important aspects of the complex of sustainable competitiveness (inclusion of minorities, working environment, water pollution,

recycling, waste management, etc.), which are not yet included in the analysis due to a lack of relevant data. Therefore, their inclusion into analysis must be the goal of the Forum in the future.

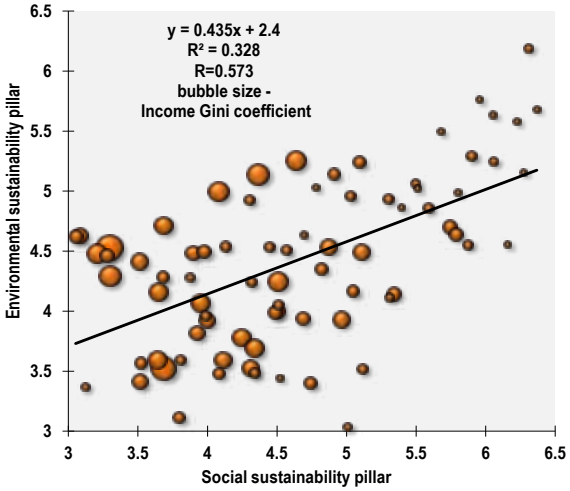
2. Empirical analysis of the sustainable competitiveness of countries in 2013

a. The analysis of the interdependence of the sustainability pillars and key indicators of the global sustainable competitiveness

For better understanding of the relational mechanisms of competitiveness in the broad sense (when, in addition to basic economic pillars that make GCI, indicators of sustainability are included), it is particularly important to examine the relationship between environmental and social sustainability. High levels of poverty and inequality can lead to unplanned urbanization, such as slums, where large segments of the population lack access to basic services. Such living conditions can have important consequences on the surroundings, including the destruction of the natural environment due to deforestation and pollution of water resources.

In this regard, Figure 3 shows a dispersion diagram for environmental and social pillars of sustainability, for 79 countries in the GCI 2012-2013 Report, which contains additional information about the Gini coefficient, represented by the size of the bubbles.

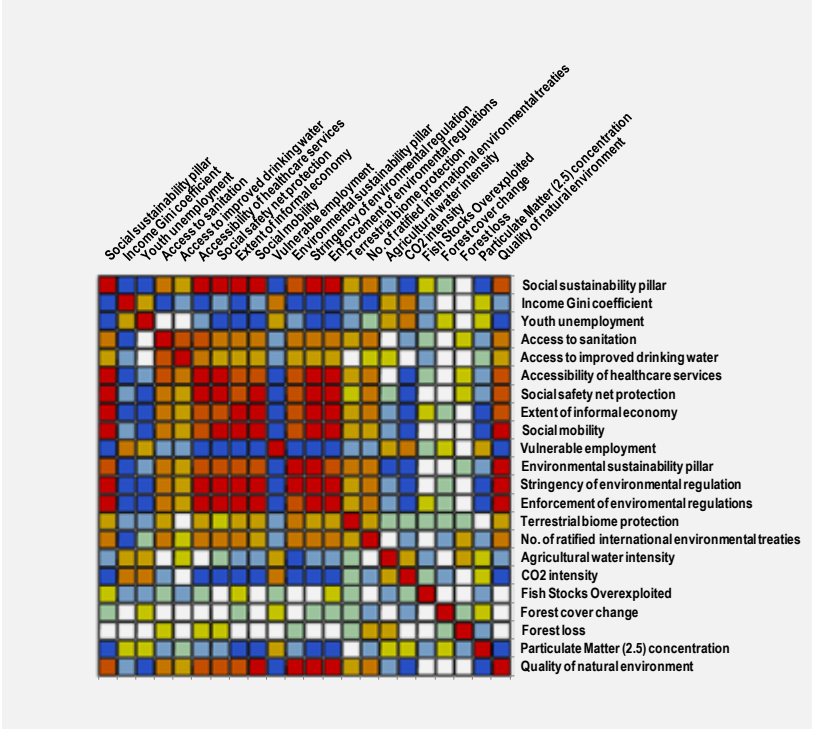
Figure 3: Dispersion diagram and linear form of interdependence between environmental and social pillars of sustainable competitiveness



Source: Authors' calculation based on Crotti (2012, August 27).

You can note a positive correlation among the observed variables. It is a positive and statistically significant interdependence (for a population of n = 79 and at a significance level of 0.01, limit value is R = 0.303). This analysis should be enhanced by including additional factors in considering the relationship between the observed variables (Figure 4).

Figure 4: Correlation matrix of all sustainability indicators (data for 79 countries in the GCI Report for 2012-13)



Source: Authors' calculation based on Crotti (2012, August 27).
(Dark shades indicate a positive correlation; bright shades indicate a negative correlation)

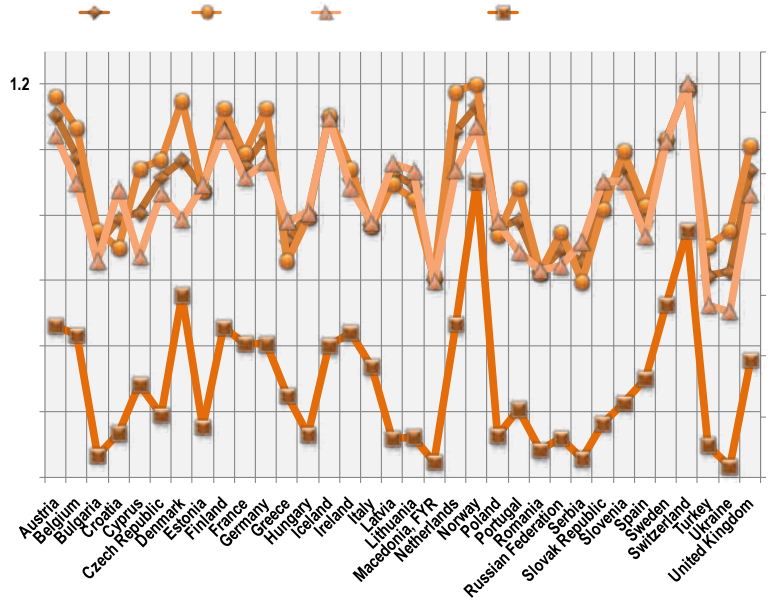
The correlation matrix was made for 79 countries, according to all the available values of the indicators that made up the two sustainability pillars within the GCI framework. Based on the matrix it is possible to conclude that in addition to the previously demonstrated positive correlation between the main pillars of a) social sustainability and b) natural environment sustainability, there is a highly significant correlation between individual indicators of both pillars. Further study of these relationships is beyond the scope of this paper, but it can be an issue for some future research.

The above data and diagrams indicate an evident positive interconnection between a) social component (represented by the social pillar of SCI) and b) environmental component of sustainable competitiveness (represented by the environmental pillar of SCI) at the global level. In other words, economies with high levels of social sustainability also have high levels of environmental sustainability (and vice versa).

b. Analysis of the relationship between SCI/GCI and GDP per capita of European countries

To shad additional light on the issue of trade-off between GCI and SCI in European countries, their relationships were analyzed. Figure 5 shows the ratio of SCI and GCI. There is also a curve representing the GDP per capita data. You can visually notice a positive relationship between these indicators in European countries.

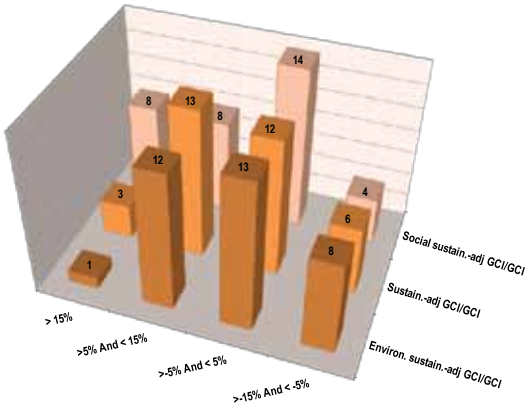
Figure 5: GDP per capita and sustainability-adjusted GCI/GCI, social sustainability/GCI and environmental sustainability/GCI ratios



Source: Authors' calculation based on Crotti (2012, August 27).

Figure 6 shows the distribution of the sustainability impact on the competitiveness of European countries through four categorized groups (significant positive impact – more than 15%, a positive impact – from 5 to 15%, a relatively neutral impact – from -5 to 5%, and a negative impact – from -5 to -15%). The impact is observed at the composite level through SGCI/GCI ratio (sustainability-adjusted GCI/GCI), as well as through relationship between GCI and its components: a) social sustainability and b) environmental sustainability.

Figure 6: The effect of sustainability on the competitiveness of European countries



Source: Authors' calculation based on Crotti (2012, August 27).

The following conclusions can be drawn:

- most countries are positioned between the relatively neutral or positive sustainability impact on competitiveness,
- significant positive environmental sustainability impact on competitiveness is achieved only in one country (Switzerland),
- significant positive social sustainability impact on competitiveness is achieved in eight countries
- significant number of European countries (16) achieves extremely positive or positive sustainability impact on the competitiveness, but still a larger portion of countries (18) is under relatively neutral or negative sustainability impact on the competitiveness.

As the metrics for sustainability impact within the GCI framework has been applied only since 2011, we believe that this is just a rough picture of the situation which will be sharpened in the coming period, by improving metrics for its monitoring. However, the above findings show a trend of increasing importance of sustainability for the global competitiveness of the economies.

c. Cluster analysis

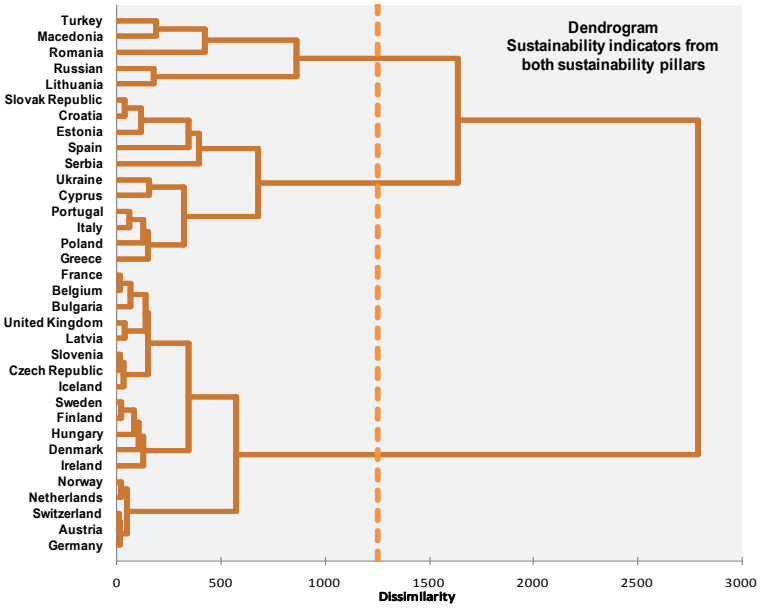
A cluster analysis of all European countries was carried out, in order to identify performance gaps in the sustainable competitiveness between the most competitive and the least competitive European countries.

In the process of clustering 34 countries according to the observed variables (all indicators of both sustainability pillars were observed), the bottom-up method was used by applying the agglomerative hierarchical clustering. First, each country was considered as a separate cluster (Figure 7). Then, based on values of the observed variables, they merged into pairs of clusters until all monitored entities were consolidated within a single cluster. In Figure 7, cluster dendrogram is formed by performing cluster analysis according to all available indicators data that make up the two sustainability pillars within the GCI framework (GCI Report for the year 2012-2013). At the dissimilarity level of around 1800, the diagram clearly shows two clusters that separate leading portion of European economies from the rest of the countries. At the dissimilarity level of around 1000, the rest of the European economies are divided into two clusters. At the dissimilarity level of around 200, also a leading cluster is divided into three sub-clusters; Norway, the Netherlands, Switzerland, Austria and Germany show the greatest uniformity, and these countries make up one of the three formed sub-clusters.

It would be interesting for some further analysis to study the separate cluster dendrograms formed on the basis of indicators of individual components of social sustainability and environmental sustainability.

However, in this paper cluster analysis was used to show a quite sharp polarization of European countries in terms of sustainable competitiveness.

Figure 7: Dendrogram by the sustainable competitiveness indicators of European countries



Source: Authors' calculation based on Crotti (2012, August 27).

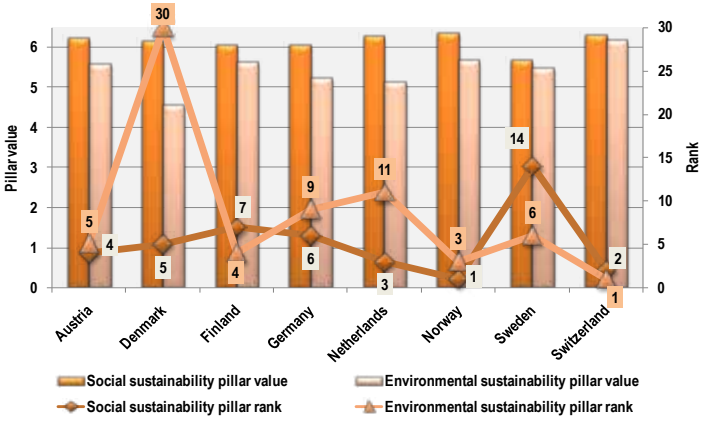
d. Graphical analysis of sustainable competitiveness of European leaders and the least competitive European economies

For a more detailed examination of the potential performance gap in sustainable competitiveness between European leaders and the least competitive European economies, a detailed graphical analysis of all sustainability indicators was carried out. Two groups of European countries were selected. The first group includes countries that occupy leading positions based on the criterion of sustainable competitiveness in Europe in 2013 (Austria, Denmark, Finland, Germany, the Netherlands, Norway, Sweden and Switzerland). The second group includes countries that have recorded the lowest values of the SCI in Europe in 2013 (Bulgaria, Croatia, Greece, Macedonia, Romania and Serbia).

Figure 8 illustrates the rank and value of the sustainability pillars of countries – European leaders. In some countries (Denmark is an extreme case) the imbalance of these pillars is very noticeable.

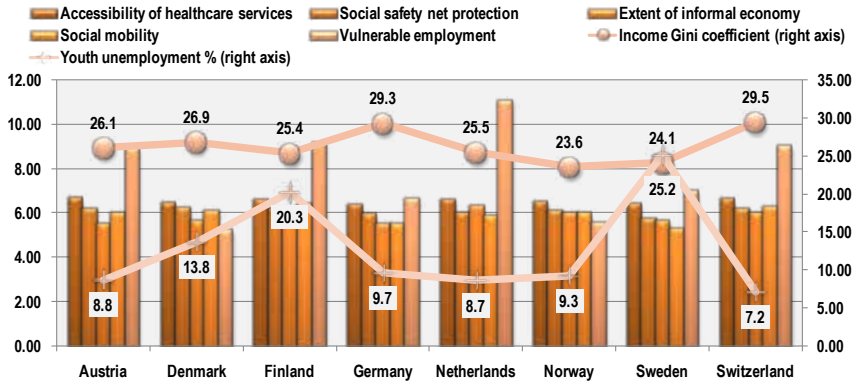
Switzerland ranks first in terms of sustainability-adjusted GCI, has a good performance in all aspects of sustainable competitiveness, and shows that there are no necessary compensatory relationships between environmental or social sustainability requirement and competitiveness requirement. Similarly, the Nordic countries are good at both dimensions, and Norway is the first in group with the highest score in both areas. These countries are very good in terms of the GCI value, which is adjusted for social sustainability (Norway, Denmark, Finland and Sweden have a score in the top 10 ranked economies).

Figure 8: Ranks and values of the sustainability pillars– European leaders



Source: Authors' calculation based on Crotti (2012, August 27).

Figure 9: The basic parameters of social sustainability pillar for leading economies of Europe

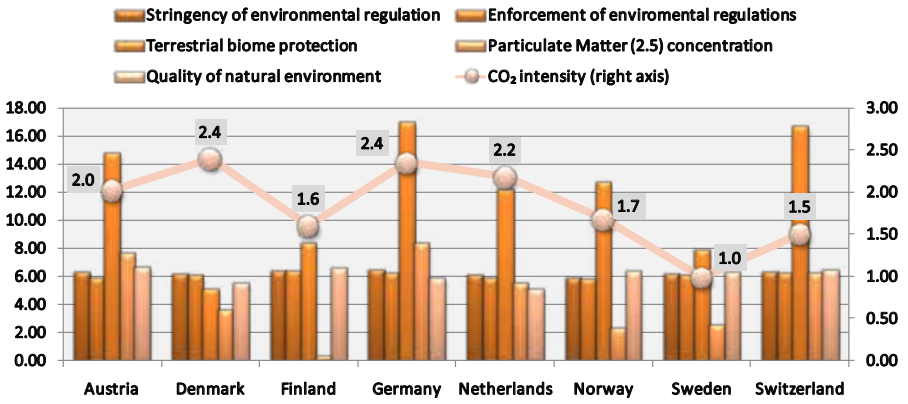


Source: Authors' calculation based on Crotti (2012, August 27).

Figure 9 shows the key social sustainability indicators of the leading European economies. A larger portion of indicators is uniform, and it is quite logical due to cluster dendrogram shown in Figure 7. Sweden has a relatively high rate of youth unemployment (25.2%), which determines its somewhat lower performance.

Norway has the best Gini index, and also has a good performance (in the top 10) in terms of all social sustainability indicators. The Nordic countries also have good results in terms of environmental sustainability-adjusted GCI, but share a common problem related to overfishing and terrestrial biome protection (Figure 10).

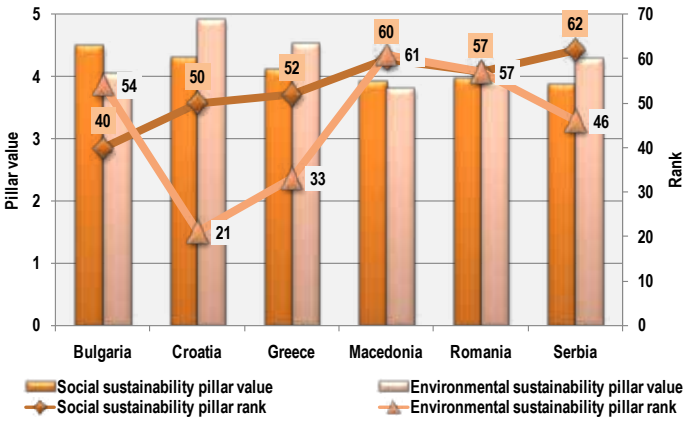
Figure 10: The basic parameters of environmental sustainability pillar for leading economies of Europe



Source: Authors' calculation based on Crotti (2012, August 27).

Figure 11 illustrates the relationship between rank and values of the pillars of social and environmental sustainability for the least competitive European countries covered by the GCI Report 2012-13.

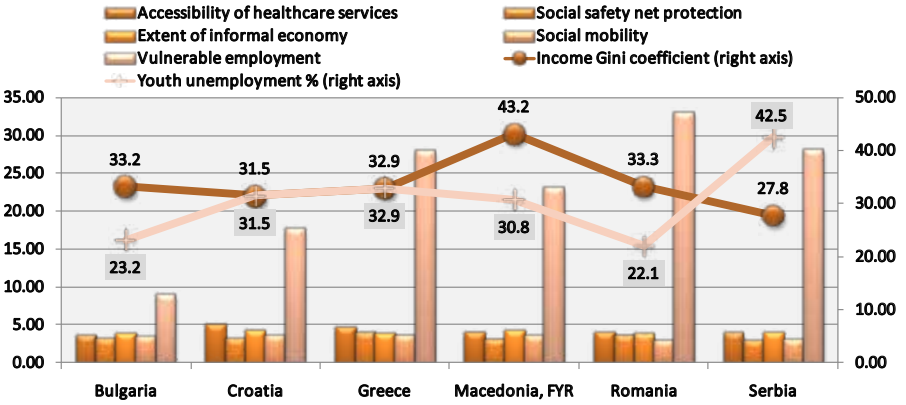
Figure 11: Values and ranks of the sustainability pillars for the least competitive European countries



Source: Authors' calculation based on Crotti (2012, August 27).

In some countries from this group the sustainability pillars imbalance is more emphasized than that of European leaders (Croatia and Greece, for example), while in others you can notice identical or similar positions of both of these pillars (Macedonia, Romania).

Figure 12: The basic parameters of social sustainability pillar for the least competitive European countries

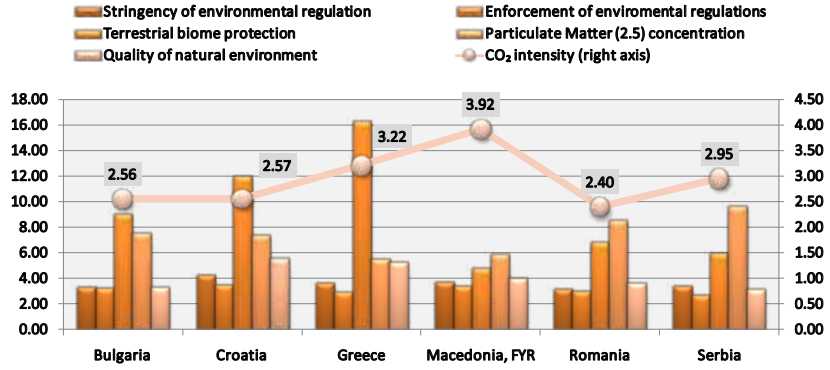


Source: Authors' calculation based on Crotti (2012, August 27).

Figure 12 presents the key social sustainability indicators of the least competitive countries of Europe. A larger portion of indicators is uniform, and it is quite logical due to cluster dendrogram shown in Figure 7. There is high rate of vulnerable employment, which is in all countries considerably higher than rate in the most competitive European countries (Bulgaria is an exception; this indicator in Bulgaria is at the average level of European leaders).

Figure 13 shows the key environmental sustainability indicators of the least competitive countries of Europe. Uniformity of a large portion of indicators can be observed. However, there is an extremely high CO2 intensity rate, which tells us that their economic competitiveness is based mostly on dirty technologies.

Figure 13: The basic parameters of environmental sustainability pillar for the least competitive European countries



Source: Authors' calculation based on Crotti (2012, August 27).

In short, countries at the top of the rankings according to the GCI criterion also have the best performance according to the SCI criterion, i.e. the gap between the leaders and

the least competitive European countries is transferred from domain of the basic economic competitiveness to an extended domain of the sustainable competitiveness.

Regarding the results of the analysis at the level of individual indicators, there are exceptions such as the low rate of vulnerable employment, which in Bulgaria is at the level of EU leaders, or on the other hand, relatively high Gini coefficient of Germany and Switzerland, which is at the average level of the least competitive countries group.

3. Conclusion

It turns out that there is a significant compatibility between economic performance and achieved level of long-term sustainability of the economic systems in European countries. In other words, it turns out that there is no imperative of sacrificing the economic welfare in favor of long-term social and environmental sustainability. We can even say that the social efforts at improving social and environmental sustainability are rewarded with additional improvement in economic prosperity. The further question is how stable the process actually is in the long run and at a global scale, i.e. whether European countries maybe spill over their sustainable competitiveness to non-European economies, which could be a way for some further research on this topic.

The analysis revealed a positive correlation between GCI and SCI. In short, countries that are at the top of the rankings according to the GCI criterion are also the best in most of the environmental and social dimensions of sustainable competitiveness. This finding may be of use in creating and practical realization of sustainable development policy, as well as the policy of improving the competitiveness of European countries in the twenty-first century.

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